

CLINICAL OBSERVATIONS AND RESEARCH WORK.<sup>1</sup>

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"As clinical observers we study the experiments which nature makes upon our fellow-creatures. These experiments, however, in striking contrast to those of the laboratory, lack exactness, possessing as they do a variability at once a despair and a delight—the despair of those who look for nothing but fixed laws in an art which is still deep in the sloughs of empiricism; the delight of those who find it an expression of a universal law, transcending, even scorning, the petty accuracy of test-tube and balance, the law that in man, 'the measure of all things,' mutability, variability, mobility are the very marrow of his being."

In these words the immortal Osler, himself the delight and the despair of his admirers, characterizes the basic principles of the relation between clinical observation and research work, the subject we have chosen for these remarks this evening.

Osler makes it plain that medicine is as yet not an exact science but an art. But it is fortunate for mankind that the boundaries of the art have been invaded and its frontiers gradually made narrower by science which not only routes empiricism and gives logical reasons for practices which have stood the test of time, but adds new knowledge with which to carry on with greater certainty the battle for the control and perhaps for the ultimate prevention of disease. To acquire an art, it is needless to say, takes time, takes unceasing enthusiasm and labor, takes experience. The acquisition of a science demands a similar price. In both art and science the first requirement is imagination; without it, we cannot hope to produce either an immortal artist or an immortal scientist.

But imagination without observation, experiment and comparison would lead us no further than merely to the door of progress. It is rare that the artist or the scientist is endowed with all of these qualifications. There are few Pasteurs, few Newtons, few Ehrlichs. Medicine is the most difficult and intricate of all the arts and sciences, and we are confronted at every turn with problems and confusion. If one individual, except he be of the very elect, can hardly master the known facts and put them to use, how then can anyone mind both apply its acquired knowledge and at the same time explore new fields?

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Fortunately by combining the talents of the two or three or more individuals we are able to muster the best and establish principles with which to labor for the benefit of mankind.

The practical application of this combination of talents, as no doubt you are aware, has its beginnings in the medical school. It is there that the most significant changes have been made, and parenthetically are still required, to lift the study of medicine out of the slough of empiricism in which, to a great extent, it still lingers. The medical school requires on its teaching staff—and to my mind teaching is the essential function of a medical school—the services not only of theorists but more important of practical experienced clinicians, whose observations among their patients prepare their minds and those of their students for the problems living patients suggest. For as Pasteur tersely expresses it, "In the fields of observation chance favors only the prepared mind." One of the significant changes above referred to is the introduction of laboratory methods into the regular curriculum of the medical school. It is in the "do-it-yourself" idea that the student of today has perhaps the greatest advantage over the student of a former time. By gradual steps he advances from the simpler forms of laboratory work to the more complex problems presented by the human laboratory. It is not, however, from the former sources that we should expect to derive the most valuable information. The observations made and the experience gained in this school work should be entirely preparatory.

Without wishing to detract in any way from the invaluable work that has emanated from the various research laboratories throughout the country, carrying on their work independently of a hospital organization, I should like here to record my conviction that the logical place for a laboratory of medical and surgical research is in connection with a well-established, well-conducted modern hospital. "The experiments of nature" can best be observed, studied and applied in a laboratory connected with such an institution. I should therefore like to see more endowments assigned to hospital research laboratories and in turn also I should like to see a more generous attitude on the part of the hospitals in throwing open their doors to students eager to observe, perhaps later to experiment, and finally to compare the results of such observations and experiments.

Every properly conducted hospital contains within itself the clinical material essential for stimulating imagination, observation, etc.; in other words, every patient represents an actual or potential question mark demanding attention.

The real wealth of material necessary for practical research can be obtained only from the hospital. With the study of each patient, whether or not he has been cured, there must accrue a direct benefit to that patient or to his successors. Social betterment is the watchword of our times, and it is a well-recognized

fact that while the care of the sick is the primary and essential function of the hospital, it is not the only one; quite as important is its duty to that supreme question, the improvement of the human race.

The matter of research carried on in conjunction with a hospital has been appreciated for a long time in European centers. Some of the most important and epoch-making discoveries in the conquest of disease, as we all know, have emanated from such institutes. The work of Ehrlich, to cite probably the most trenchant example, was not in a medical training laboratory but in a hospital laboratory. There is little doubt but that to this policy of establishing hospital laboratories, not only of pathology but of bacteriology, physiology, chemistry and all the allied sciences, Germany, for example, owes much of the conspicuous place which she has achieved during the last half-century.

The head of the laboratory should preferably be a pathologist, because pathologic anatomy is still the most important of the fundamental subjects. Furthermore a good pathologist is usually well trained also in bacteriology and physiology, and he is in a position to appreciate investigations into functional activities of the body, normal and abnormal. Most of the questions to be investigated could be such as are of direct clinical value, although it must be recognized that knowledge, provided it is true knowledge, of even the most unpractical and seemingly academic interest only awaits the magic touch of inspiration, perhaps further work, to make it yield abundant fruit. For our purposes animal experimentation, I need scarcely say, is indispensable. And yet in our enlightened country and in other supposedly enlightened countries legislators are kept busy listening to the arguments of individuals who would perforce prevent the use of this beneficial and essential method of investigation.

Our knowledge of most diseases in their progress can be obtained in the most convincing way only by experimental work on animals. In our struggle for the prevention of disease we can use only animals who are susceptible to the disease under investigation, reproduce it in such animals and then endeavor to cure it. One of the main reasons, for example, why we know so little of influenza, which in late years has played such havoc among humankind, is because no one has yet succeeded in transmitting the disease in its human form to an animal, so that it might be accurately studied.

The value of laboratory work to the surgeon is nowadays taken for granted. In diagnosis it has its supreme function in furnishing confirmatory and oftentimes positive evidence; no less valuable are the clinical tests which indicate the state of functional activity, particularly of the kidneys, and which in favor or against operative intervention in certain cases. To the experimental physiologist the surgeon owes his knowledge of how far he can venture in radical surgery—knowledge which he would never have dared to obtain

from the human subject as the experimental object. On the other hand, when a brilliant flash of the imagination, which so often comes in the presence of an emergency, has suggested a new operative procedure, the laboratory investigator immediately begins to study the safety of the method and its rationale. A striking example of such circumstance is the operation of gastro-jejuno-stomy which has become an every-day procedure in most surgical clinics. When confronted with an inoperable carcinoma of the pylorus, Wölfer was about to close the abdomen, when his assistant, Nicoladini, suggested anastomosing the small bowel with the anterior wall of the stomach, thus providing a new exit for the food. Although the operation in its original form proved a poor one from a physiologic standpoint, it formed the basis of study for the development of the methods now in use which have proven of such marked benefit to a large class of sufferers from abdominal disorders. It is difficult to find a more significant example of the value of clinical observations to surgical research than this simple operation. Again, the clinician is often able to apply nature's experiments in a practical way to his surgical work. We need only mention such a phenomenon as a spontaneous cholecystoenterostomy, which is often as successful in relieving distress as the artificial anastomosis which the surgeon, imitating nature, occasionally uses.

These and numerous other instances which might be cited show the importance of well-equipped laboratories as an integral part of a modern hospital. We must emphasize the human as well as the material equipment, for without a well-trained staff of workers in the laboratory, we can make very little progress in our problems. It should be the function of such a research staff to keep abreast of all new suggestions, to offer new methods and to extend knowledge by verification and experiment, and, on the other hand, the wideawake clinician, with problems staring him in the face, should make the best use not only of the hands of this laboratory staff, but of their brains as well. Sir Almoth Wright has said that "Laboratories not attached to hospitals cannot turn out good work without stimulus of fresh material from the hospital—they suffer from paucity of ideas." They, we believe, also lack the mutual inspiration to be derived from the working together of the clinical and the laboratory staff.

The present era is without doubt the era of combined research based on the correlation of clinical observation and experimental inquiry. To it surgery owes its wonderful forward strides since the days of Pasteur and Lister. It is only by the further development of this team work between the hospital and the laboratory that the former can properly perform its function in caring for the sick and the suffering, and the latter can hope to make worthy contributions to the ideal that animates the science and the art of medicine, the prevention and eradication of disease.